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Wang

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[54] **INFLATABLE TOY WITH MOVABLE MECHANISM**

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[51] **Int. Cl.**[4] **A63H 27/00**

[52] **U.S. Cl.** **446/232;** 446/225; 446/241

[58] **Field of Search** 446/220–226, 446/232, 241, 259, 260, 186, 187, 197, 201; 92/31, 33, 36, 92

[56] **References Cited**

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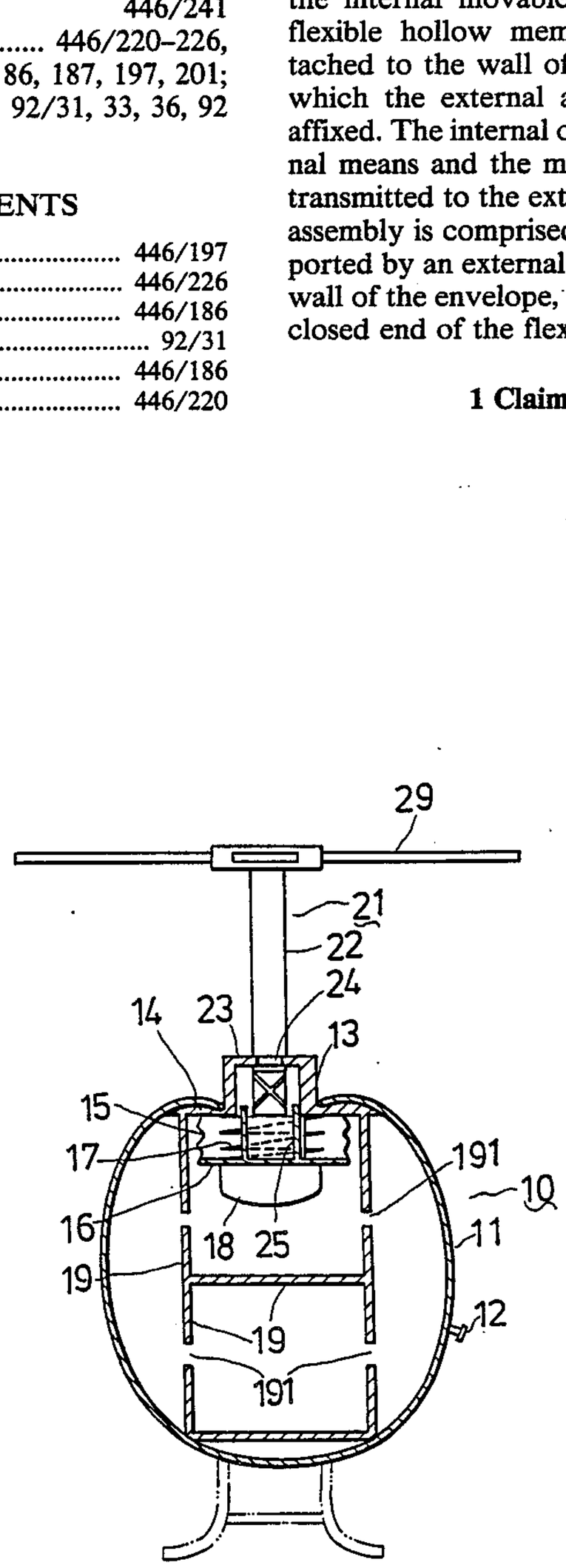
Assistant Examiner—Daniel Nolan
Attorney, Agent, or Firm—Cushman, Darby and Cushman

[57] **ABSTRACT**

An inflatable toy comprises at least one external rotary assembly mounted outside the inflatable envelope and at least one internal movable object mounted inside the inflatable envelope. The external rotary assembly and the internal movable object are interconnected by a flexible hollow member which is heat-weldedly attached to the wall of the toy and has a closed end to which the external assembly and internal object are affixed. The internal object can be operated by an external means and the movement of the internal object is transmitted to the external rotary assembly. The rotary assembly is comprised of a rotatable part which is supported by an external supporting means attached to the wall of the envelope, and a rocking part attached to the closed end of the flexible hollow member.

1 Claim, 6 Drawing Figures



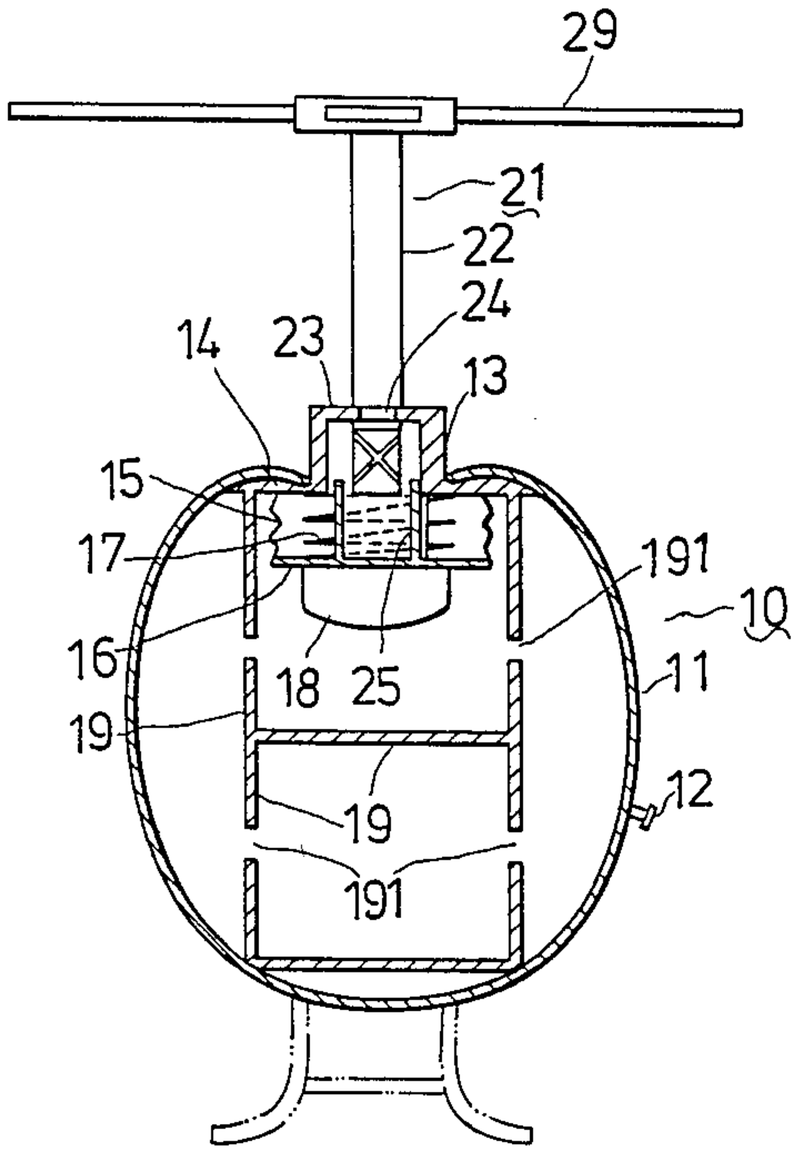


FIG.2

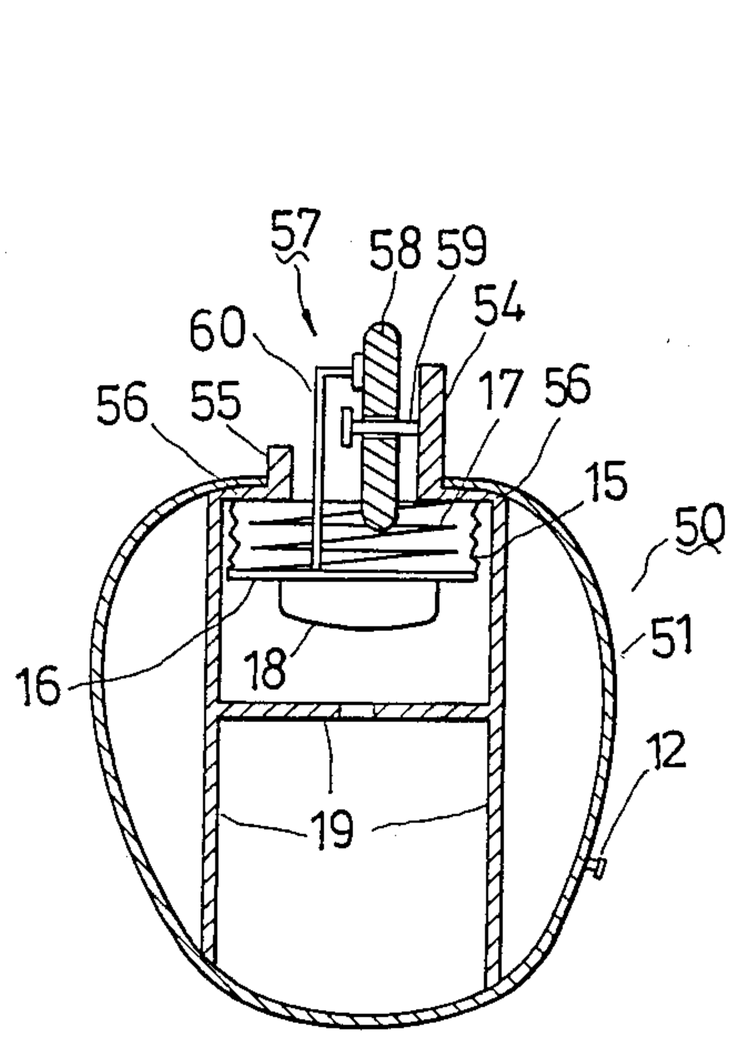


FIG.1

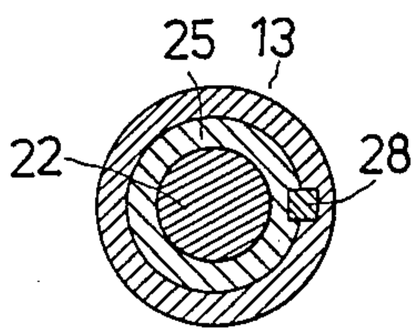


FIG.4

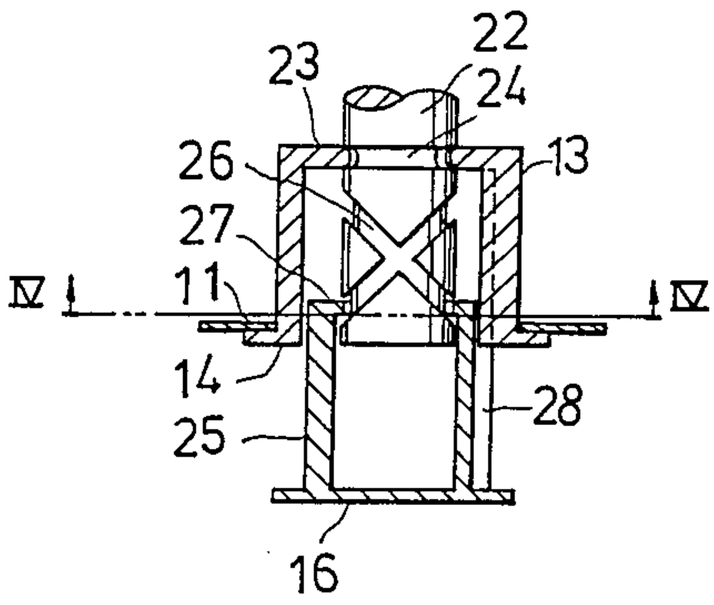


FIG.3

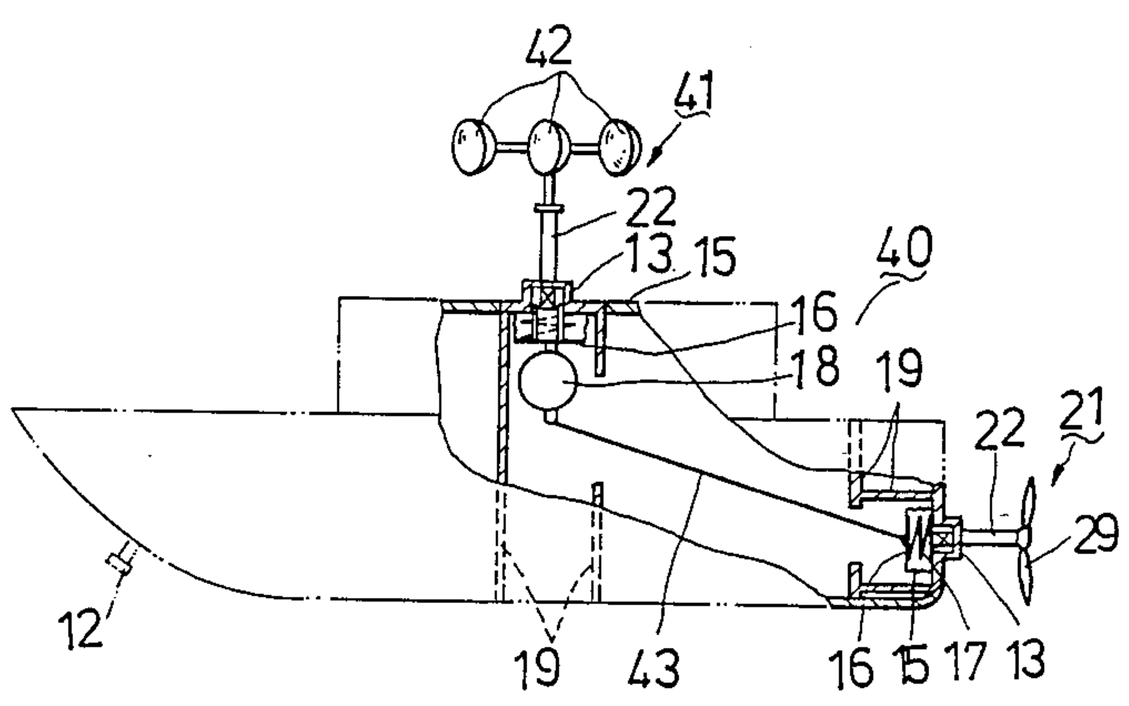

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FIG.5

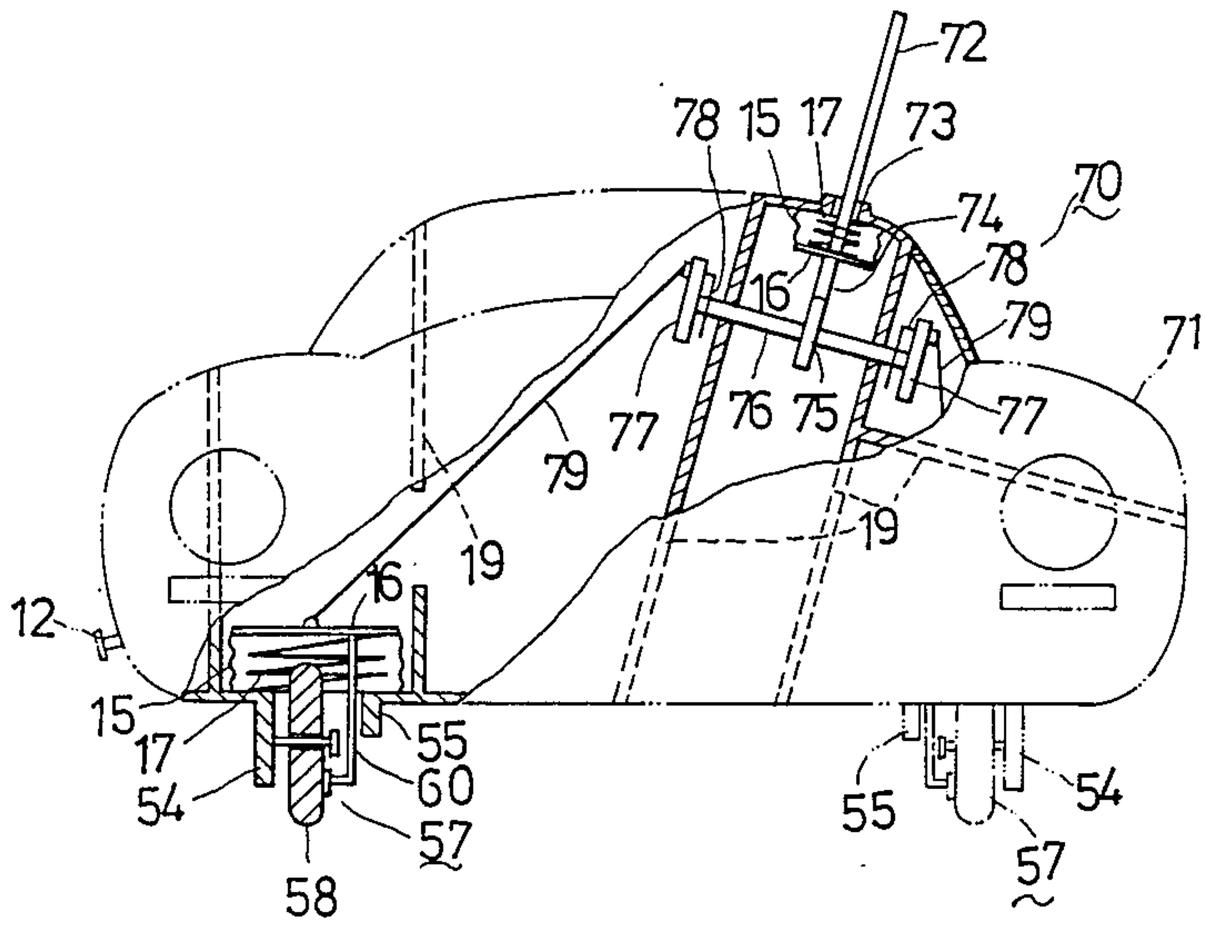
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FIG.6

INFLATABLE TOY WITH MOVABLE MECHANISM

BACKGROUND OF THE INVENTION

This invention relates to an inflatable toy, particularly to an inflatable toy which has an external rotary assembly to control an internal movable assembly, or an internal movable assembly to control an external rotary assembly.

Inflatable toys with externally controlled internal movable objects have been known in the prior arts. U.S. Pat. No. 4,291,487 discloses inflatable toys having internal movable objects controlled and operated by an external means, such as cord, or rod, which makes linear motion. Although internal objects can operate with either linear or rotary motion inside the inflatable body, there are not provided any external means that can be operated by the internal objects.

SUMMARY OF THE INVENTION

It is an object of the invention to provide an inflatable toy which has internal movable objects such as, oscillator to operate an external rotary assembly.

Another object of the invention is to provide an inflatable toy which has an external rotary assembly driven by an natural force, such as, wind, to operate internal movable objects.

Further object of the invention is to provide an inflatable toy which has an external rotary assembly and internal movable objects that can be operated by an external means.

According to the invention, an inflatable toy includes an envelope made of a gas impervious flexible material which is resilient in part, means for inflating the envelope, and a flexible hollow member having an open end sealingly connected to the wall of the envelope and inwardly projected from the wall, the projection end thereof being closed. An internal movable unit having at least one element which makes linear movement is provided inside the envelope and the linearly movable element is connected to the closed end of the hollow member. There is further provided an external rotary assembly having a rotating part held by an external supporting means and having a rocking part connected to the closed end of the hollow member. The external supporting means is heat weldedly connected to the wall of the envelope and projected outwardly. The internal movable unit can be operated by an external means, such as by vibrating the wall of the envelope with hand, and the movement of the internal movable unit can be transmitted to the external rotary assembly for rotary movement.

Advantageously, the internal movable unit includes a mass suspended from the closed end of the flexible hollow member.

In an aspect of the invention, the inflatable article can include a further rotary assembly mounted outside the wall of the envelope. This further rotary assembly may also include a rotating part supported by a further external supporting means and a rocking part connected to a further flexible hollow member which has a closed projecting end. The two external rotary assemblies are interconnected by the internal movable object and the movement of one of the external rotary assemblies caused by an external means can be transmitted to another rotary assembly through the internal movable unit.

In another aspect of the invention, the inflatable article can include an internal movable unit, an external rotary assembly and an external manually operated means to actuate the internal movable unit. In this case, the internal movable unit can be operated through the external manually operated means and the movement thereof can be transmitted to the external rotary assembly.

Advantageously, the external supporting member can be a rigid hollow in communication with the flexible hollow member. The external rotary assembly may include, a rotatable shaft having a coarse endless helical thread provided thereon and held by the rigid hollow member in a position in which it is allowed to rotate but prevented to move axially, and an axially movable sleeve member connected to the closed end of the flexible hollow member and having an engaging means to be engaged with the thread.

Alternatively, the external supporting member can be a bracket outwardly projected from the wall of the envelope. The external rotary assembly may include, a wheel rotatably mounted on the bracket, and a rocking arm connected to the closed end of the flexible hollow member and to the wheel at a point radially offset from the center of the wheel.

The internal movable unit can be a device that can store an energy, upon being acted by the manually operated means, to operate the external rotary assembly.

The manner in which the above and related objects are accomplished together with the attending advantages and features of the invention will appear more fully from the following detailed description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic view of a third embodiment;

FIG. **2** is a schematic view of a first embodiment;

FIG. **3** is an enlarged view of the portion taken from FIG. **2**;

FIG. **4** is a fragmentary sectioned view taken from the line IV—IV of FIG. **3**;

FIG. **5** is a schematic view of a second embodiment of the invention; and

FIG. **6** is a schematic view of a fourth embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIGS. **1** through **6**, there are shown four embodiments of the invention in which elements that are in the same construction and perform in the same manner are designated by the same reference numerals.

As shown in FIG. **2**, a first embodiment of the invention includes an inflatable toy **10** which has an envelope **11** shaped to conform to a helicopter and made of a gas impervious flexible material which is resilient in part. A valve **12** is provided on the wall of the toy for inflating purposes. There is further provided an opening at which a rigid support member **13** which is in the form of a hollow cylinder is heat-weldedly attached to the flexible wall of the envelope **11** with its flange **14**. A flexible hollow member **15** is heat sealed to the flange **14** with its open end and is inwardly projected from the inner wall of the envelope. The projecting end **16** of the flexible hollow member **15** is closed. A spring **17** is affixed to the flange **14** and the closed end **16**. From the closed end **16**

is further suspended a mass **18** of certain weight. This can be accomplished by heat sealing a plastic body which is weighed by a metal mass or the like.

There is further provided an inner supporting means which can be a plastic plate **19** heat-weldedly attached to the inner sides of the walls of the toy **10**. It can be provided with perforations **191** so that the plate **19** will allow communication everywhere in the envelope.

An external rotary assembly **21** outside the wall of the toy **10** is comprised of a rotatable shaft **22** which is mounted in the rigid hollow supporting member **13** in a manner that the shaft **22** is allowed to rotate but prevented to move axially as better seen in FIGS. **3** and **4**. This is accomplished by providing an annular projection **23** at the end of the rigid supporting member to engage with an annular recess **24** provided in the periphery of the shaft **22**, and providing an axially movable sleeve member **25** which is heat welded to the closed end **16**. A coarse, endless helical thread **26** is further provided on the shaft **22** below the annular recess **24** for engaging with a projection **27** of the sleeve member **25**. Between the sleeve member **25** and the supporting member **13** is provided a guide key **28** which is fixed to the sleeve member **25** and is slidably received in a recess provided in the wall of the supporting member **13**. At the end of the shaft **22** is provided a propeller **29**.

In the operation, the wall of the toy **10** is caused to vibrate such as by squeezing or the like manner, and accordingly the mass **18** will oscillate. The oscillating movement of the mass **18** is transmitted to the closed end **16** of the flexible hollow member **15** and then to the sleeve member **25** for up and down movement. As the sleeve member **25** is moved, the projection **27** that can only make axial movement will cause the helical thread **26** to move so that the shaft **22** will rotate.

Now referring to FIG. **5**, the second embodiment of the invention includes an inflatable toy **40** which is shaped to conform to a ship and is made of a gas impervious flexible material which is resilient in part. A valve **12** is provided on the wall of the toy **40** for inflating purpose. Two openings are provided respectively at a top portion and a rear portion of the toy ship **40**, and at these openings are respectively provided two flexible hollow members **15**, two springs **17**, and two rigid support members **13**. From the closed end **16** of one of the flexible hollow members **15** is suspended a mass **18** of certain weight.

Plates **19** are attached to the inner side of the wall of the toy **40** as an internal supporting means. An external rotary assembly **21** is mounted on one of the support members **13** and is in the same construction as the external rotary assembly of the first embodiment. The propeller **29** of the rotary assembly **21** provided at the rear portion of the toy ship **40** will act as a drive means for the toy. The propeller **29** is operated, through a connector **43** which can be a string, by another external rotary assembly **41** which is substantially in the same construction as the rotary assembly **21**, except having a meteorological object which includes wind actuated cups **42**, instead of the propeller **29**.

Now referring to FIG. **1**, there is shown a third embodiment which includes an inflatable toy **50** which has an envelope **51** made of a gas impervious, flexible and resilient material. The envelope has an opening at which is provided a flexible hollow member **15**, a spring member **17** and an inflating means **12**. An external supporting means which may be comprised of two brackets **54** and **55** each of which has a flange **56** heat welded to the wall of the envelope **51**. At the closed end **16** of the flexible hollow member **15** is attached a mass **18** which can be motive when an external force acts on the envelope to make the wall thereof vibrate.

An external rotary assembly **57** is mounted to the external supporting means. It includes, a wheel **58** rotatable on a horizontal shaft **59** which is supported by the bracket **54** and a rocking arm **60** which is attached to the wheel **58** at a point radially offset from the center thereof and connected to the closed end **16** of the flexible hollow member **15**. When the mass **18** is motive, the movement of the closed end **16** of the flexible hollow member **15** is transmitted to the rocking arm **60** and then the rotatable wheel **58**.

Referring to FIG. **6**, there is shown a fourth embodiment which is an inflatable toy **70** having an envelope **71** shaped to conform to a car toy and made of a gas impervious flexible material which is resilient in part. The toy **70** has four external rotary assemblies **57** which behave like wheels of the car (only two front wheels are shown in FIG. **6**). Each of the rotary assemblies **57** is mounted outside the envelope **71** by means of the supporting means having two brackets **54** and **55** and the flexible hollow member **15**, and can be operated by an external manually operated means through an internal movable unit. The external manually operated means is formed into a radio telescopic tube **72** which can be operated by hand to move the closed end **16** of a flexible hollow member **15** provided at the top of the toy **70**. The telescopic tube **72** is attached to the closed end **16** and is supported by a supporting member **73** which is in the form of a sleeve and heat welded to the envelope **71**.

To the inner side of the closed end **16** is attached a rack **74** having inclined teeth (not shown) thereon and engaged with a ratchet **75** which makes one direction rotary movement when the rack **74** move downward and is mounted on a shaft **76** which is journalled in the inner supporting plates **19**. At the two ends of the shaft **76** are attached two rotatable discs **77** and to each of the discs **77** is affixed a flat sprial spring **78** with its one end. The other end of the spring **78** is fixed to the shaft **76** so that it can be wound about the shaft **76** when the ratchet **75** rotates in a single direction. This spring **78** stores an energy which will be then given to the disc **77** to rotate when it reverses to its original position.

The rotation of a disc **77** will be transmitted to the closed end of the flexible hollow member **15** to which a wheel is attached, through a connecting means which can be a rigid rod **79** having one end connected to the closed end **16** and another end connected to the disc **77** at a point radially offset from the center of the disc **77**. The movement of the closed end **16** of the flexible hollow member **15** will cause the wheel **58** to move via rocking arm **60**. It is to be noted that, when the rack **74** and the ratchet **75** are operated, the disc **77** must be immobilized such as by catching the wheel **58** with hand so that the rotation of the shaft **76** can make the spring wind on the shaft **76**.

With the invention thus explained, it is apparent that obvious modifications and variations can be made without departing from the scope of the invention. It is therefore intended that the invention be limited only as indicated in the appended claims.

What I claim is:

1. An inflatable article comprising:

an envelope having a wall made of a gas impervious flexible material which has a resilient portion and which has an opening in a portion of said wall;

means for inflating said envelope;

a flexible hollow member having an open end sealingly connected to said wall and communicated with said opening, said hollow member having a closed end projecting into said envelope from said wall;

a spring member disposed in said hollow member for providing a resiliency;

a rigid hollow external support member, in communication with said flexible hollow member, projected from and connected to said wall at an adjacent position thereon relative to said flexible hollow member;

an internal supporting member inside said envelope and attached to said wall;

a linearly movable element provided inside said envelope and connected to said closed end of said hollow member; and

an external rotary assembly having a rotating part held by said external supporting member, the rotary assembly including a rotatable shaft having an endless helical thread provided thereon and an axially movable sleeve member and an engaging member engaged with said thread.

* * * * *